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Unit Information Management Practices at the Joint Readiness Training Center

Kenneth L. Evans
U.S. Army Research Institute

Major Richard P. Reese and First Sergeant Louis Weldon
Joint Readiness Training Center

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14. ABSTRACT *(Maximum 200 words)*:

The present investigation sought to quantify unit information management (IM) practices at the Joint Readiness Training Center (JRTC) and to determine the extent to which a job performance aid, the IM Guide, might improve unit IM performance. IM practices were measured by observer/controllers using the IM Checklist, a tool developed especially for the investigation. Over the course of seven unit rotations at JRTC, 758 checklists were collected and analyzed. The IM Guide was found to be of benefit to companies, but not to either battalions or platoons. Overall, units were able to address specified information requirements fairly well, though they had much greater difficulty answering implied requirements. In terms of information quality, units were better at providing accurate and reliable information than they were at providing complete and precise information. Units that included IM in their planning process and units that rehearsed their communication plans were more likely to have IM that enhanced mission accomplishment than units that did not do those two things.

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Kenneth L. Evans
U.S. Army Research Institute

Major Richard P. Reese and First Sergeant Louis Weldon
Joint Readiness Training Center

Infantry Forces Research Unit
Scott E. Graham, Chief

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UNIT INFORMATION MANAGEMENT PRACTICES AT THE JOINT READINESS TRAINING CENTER

EXECUTIVE SUMMARY

Research Requirement:

The need to investigate the information management (IM) practices of units at the Joint Readiness Training Center (JRTC) was widely recognized by members of JRTC's Warrior Leadership Council. Operating under the direction of the Deputy Commander of the Operations Group, the Council consists of representatives from each Operations Group division, the 1st Battalion (Airborne) 509th Infantry, the Center for Army Lessons Learned, the Research, Development and Engineering Command (RDECOM), and the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI). The primary purpose of the Council is to leverage the expertise of JRTC observer/controllers (O/Cs) in order to identify and prioritize the most serious small unit leader deficiencies found across rotations.

A frequent topic of discussion in after action reviews (AARs) of unit performance at JRTC, IM was one of the most common and widespread of all problems identified by the Council since its inception in 2004. The identification of this need led to the present investigation, the purpose of which was twofold. First, the Council wanted to determine the overall prevalence of various unit IM practices at JRTC, in an attempt to pinpoint those IM areas in which units have the greatest difficulty. Second, the Council wanted to evaluate the effectiveness of a job performance aid, the IM Guide. Specifically, they wanted to know if units given IM Guides at the beginning of their rotation would subsequently exhibit better IM practices than units that were not given these guides.

Procedure:

The Warrior Leadership Council developed the IM Checklist as a measurement tool for O/Cs to use in gauging the IM performance of battalions, companies, and platoons during force-on-force missions at JRTC. The Council then developed the IM Guide as a job performance aid that could be easily carried and used by Soldiers during these missions. The IM performance of units that were given copies of the IM Guide, the experimental group, was compared to the IM performance of units that not been given this job performance aid, the baseline group. Baseline IM data were drawn from 489 checklists collected by O/Cs during four consecutive unit rotations in 2006. Experimental IM data were drawn from 269 checklists collected during three later rotations in 2006 and 2007.

Findings:

In terms of information relevance, units were able to address specified information requirements fairly well, but they had much greater difficulty answering implied requirements. In terms of information quality, units were better at providing accurate and reliable information than they were at providing complete and precise information. Although most units were able to

operate their communication systems efficiently, they found it more difficult to maintain a continuous flow of information with those systems. Units that included IM in their planning process and units that rehearsed their communication plans were more likely to have IM that enhanced their mission accomplishment than units that did not do those two things.

The IM Guide appeared to be of benefit to companies, though there was little evidence to suggest it improved the IM performance of battalions or platoons. Companies given the IM Guide were significantly more likely to maintain a continuous flow of information, to efficiently operate their systems, and to have Soldiers that were trained to use their systems. In addition, these companies were significantly more likely to answer both specified and implied information requirements, while disseminating information that was significantly more useable and complete. Finally, companies with the guide were significantly more likely to have IM that enhanced their mission accomplishment than companies without the guide.

Utilization and Dissemination of Findings:

Findings were briefed to members of the JRTC Warrior Leadership Council in April of 2007. Based on the results obtained, both the authors and members of the Council recommend the continued use of the IM Checklist at JRTC, so that O/Cs can systematically gather supporting data to use in the AARs. The continued use of the IM Guide is also recommended, but only for companies. Because little value was derived from its use by battalions or platoons, it may be useful to call it the Company IM Guide henceforth. Electronic versions of the IM Checklist and IM Guide are available through ARI's public website at http://www.hqda.army.mil/ari .

UNIT INFORMATION MANAGEMENT PRACTICES AT THE JOINT READINESS
TRAINING CENTER

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Introduction

Information management (IM) has been defined as providing "relevant information to the right person at the right time in a usable form to facilitate situational understanding and decision making" (Department of the Army, 2001, p. 11-11). The need to investigate the IM practices of units at the Joint Readiness Training Center (JRTC) has been recognized by members of JRTC's Warrior Leadership Council. Operating under the direction of the Deputy Commander of the Operations Group, the Council consists of representatives from each Operations Group division, as well as the 1st Battalion (Airborne) 509th Infantry, the Center for Army Lessons Learned, the Research, Development and Engineering Command (RDECOM), and the U.S. Army Research Institute for the Behavioral and Social Sciences. The primary purpose of the Council is to leverage the expertise of JRTC observer/controllers (O/Cs) in order to identify and prioritize the most serious small unit leadership and training deficiencies found across rotations (U.S. Army Research Institute for the Behavioral and Social Sciences, 2005).

A frequent topic of discussion in after action reviews (AARs) of unit performance at JRTC, IM was one of the most common and widespread of all problems identified by the Warrior Leadership Council since its inception in 2004. In particular, Council members believed important pieces of critical battlefield information, typically available to at least a few unit members, were not being effectively disseminated across the entire unit. All too often, the lack of effective information dissemination, whatever its root cause, led to poor decision making by those who didn't have the battlefield information they needed to succeed.

To address this problem the Council began collecting data on unit IM practices in early 2006, using an O/C measurement instrument called the IM Checklist (see Appendix A). Its design and content were based on the IM doctrine contained in two U.S. Army field manuals (Department of the Army, 2001, 2003). Although the Council wanted to examine IM practices at battalion, company, and platoon echelons, they decided to focus most of their attention at the company level. This was done for two reasons. First, companies have a central role in unit information flow, simultaneously sending and receiving information across multiple echelons, both superior and subordinate. Unlike battalions, however, companies must fulfill their IM role without a dedicated staff to collect, process, and disseminate battlefield information. Second, many Council members simply believed, based on their O/C experience, that IM was a more difficult challenge for companies than it was for either battalions or platoons.

One purpose of the present investigation was to determine the overall prevalence of various unit IM practices during force-on-force missions at JRTC, in an attempt to pinpoint those IM areas in which units have the greatest difficulty. In particular, they wanted to know what information systems were being used, whether or not Soldiers were trained to use those systems, and the degree to which information was being properly disseminated across the entire unit. In addition, the Council wanted to examine the relevance and quality of information being transmitted.

A second purpose of the investigation was to evaluate the effectiveness of a job performance aid, called the Information Management Guide (see Appendix B), in a field environment. Specifically, the Council wanted to determine if units given IM Guides at the

beginning of their rotation would subsequently exhibit better IM practices than units that were not given these guides. Job performance aids have a rich history of organizational application, especially in the military (see Department of the Army, 1999; Schultz & Wagner, 1981; Swezey, 1987). In fact, an earlier JRTC investigation found fairly strong support for the efficacy of a job aid for troop leading procedures (Evans & Baus, 2006).

Research Approach

The IM Checklist was developed by JRTC's Warrior Leadership Council as a measurement tool for O/Cs to use in gauging the IM performance of battalions, companies, and platoons during force-on-force missions at JRTC. The Council then developed the IM Guide as a job performance aid that could be easily carried and used by Soldiers during these missions. In evaluating the effectiveness of the IM Guide, the IM performance of units that were given these guides, the experimental group, was compared to the IM performance of units that had not received the guides, the baseline group. Although it would have been better to counterbalance or alternate the order of experimental and baseline unit rotations, four consecutive baseline rotations were followed by three subsequent experimental rotations. This provided an opportunity for the Council to design the IM Guide while baseline data were being collected. It also enabled the structure and content of the IM Checklist to be revised at the same time.

Sample

Baseline IM data were drawn from 489 checklists completed by O/Cs during four consecutive JRTC rotations in 2006. Experimental IM data were then drawn from 269 checklists completed during three subsequent rotations in 2006 and 2007. Over these seven rotations, 8.7% of the checklists were collected from battalions, 34.0% from companies, and 57.3% from platoons. The baseline and experimental groups did not differ significantly by echelon. However, the two groups were found to be significantly different in terms of the types of units observed [$\chi^2(12, N = 758) = 74.26, p = .001$]. These unit differences are summarized in Table 1.

Information Management Checklist

The quality of unit IM was measured by O/Cs using the IM Checklist (see Appendix A). Printed on the front and back of a card that was 8 in. tall and 5 in. wide (20.5 x 13 cm), the IM Checklist was organized into seven sections. Section I asked O/Cs to identify the unit's primary and backup communication systems, the number of each that were available (i.e., the number of systems the unit brought to JRTC), and the number of each that were operational during the observed mission. This section also had three items that dealt with how well unit personnel operated their communication systems.

Completed only by those O/Cs observing battalions and companies, Section II had a pair of summary questions concerning the relevance and quality, respectively, of information being disseminated and received. Consistent with Army IM doctrine (Department of the Army, 2001, 2003), a series of more detailed questions dealt with the four categories of relevant information

Table 1
Percentage of Checklists Collected from Various Types of Units
in the Baseline and Experimental Groups

| | Group | |
Type of Unit	Baseline (n = 489)	Experimental (n = 269)
Armor	11.9%	0.4%
Aviation	7.6%	7.4%
Cavalry	7.0%	10.8%
Engineer	4.3%	4.8%
Field Artillery	7.6%	1.9%
Infantry	29.4%	50.9%
Military Intelligence	3.3%	3.3%
Ordnance	1.6%	1.5%
Quartermaster	2.7%	2.2%
RSTA	9.0%	3.3%
Other	5.5%	5.9%
Combination of Unit Types	5.3%	3.3%
Unknown	4.9%	4.1%
Total	100.1%	99.8%

Note. RSTA = Reconnaissance, Surveillance, and Target Acquisition. The most frequently observed combinations were Cavalry/RSTA units. Total percentages do not equal 100% due to rounding.

(i.e., specified requirements answered, implied requirements answered, information gaps filled, and distracters avoided) and the six characteristics of information quality (i.e., accuracy, timeliness, usability, completeness, precision, and reliability).

Completed only by company O/Cs, Section III asked additional questions about company IM practices. Specifically, these questions asked whether or not companies had an effective system to determine information quality and relevance prior to dissemination, whether or not information was disseminated to all command post elements, whether or not information was disseminated in a standard format, and whether or not a system to store information existed. A fifth question asked who made company IM decisions.

Completed only by platoon O/Cs, Section IV had three questions about platoon IM practices. Specifically, these questions asked whether or not platoons had an effective system to determine information quality and relevance prior to dissemination, whether or not information was disseminated in a standard format, and whether or not a system to store information existed. These questions mirrored three of the five questions asked about companies in the previous section.

The final three sections were completed by O/Cs at each echelon. Section V asked two questions about communications security. Section VI had four questions about mission planning

and execution. Two of these questions dealt with the perceived relationship between unit IM and mission accomplishment. Section VII had several O/C identification items and included space for the O/C to make overall comments about the observed mission.

Most questions on the IM Checklist called for a Yes or No response. The Warrior Leadership Council chose this response scale for two reasons. First, they thought a Yes/No format would be relatively easy to use, minimizing the data collection burden on O/Cs. Second, the Council believed this format would lower the amount of subjectivity contained in the checklist data, by simply asking O/Cs whether or not particular IM practices occurred, rather than asking them to decide how good those practices were.

Largely in response to O/C feedback about checklist usability, the IM Checklist was revised several times over the course of baseline data collection. The final version of the IM Checklist, shown in Appendix A, was used exclusively during the fourth baseline rotation and all three experimental rotations. The results reported herein were based solely on items contained in the final version of the IM Checklist.

Information Management Guide

Developed by the Warrior Leadership Council as a job performance aid to highlight and concisely summarize Army IM doctrine (Department of the Army, 2001, 2003), the IM Guide was printed on the front and back of a card that was 8 in. tall and 5 in. wide (20.5 x 13 cm). Reflecting the order IM tasks would generally be accomplished during the course of most missions, the doctrinal material contained in the IM Guide was organized into the following five sections: standard operating procedure, planning, execution, mission accomplishment, and the AAR (see Appendix B).

Procedure

Through their JRTC Operations Group divisions, O/Cs were issued blank IM Checklists prior to each baseline and experimental rotation. Completed checklists were then collected at several centralized locations after each rotation had ended. An interim analysis of the findings for each rotation was completed and presented to members of the Warrior Leadership Council prior to the beginning of the next rotation.

The Council encouraged O/Cs to complete at least two IM Checklists during each rotation, one before the rotation midpoint and the other near the end of the rotation. Overall, 56.7% of the checklists received were based on observations made before the rotation midpoint and 43.3% were based on observations made after the midpoint. The baseline and experimental groups were not significantly different in this regard.

An estimated total of 600 IM Guides were distributed to units in the three experimental rotations. These guides were provided by Warrior Leadership Council members to the battalion leadership at the beginning of each rotation and they were encouraged to distribute them down to platoon level. While most Council members believed they were thoroughly distributed down to company level, some questioned how well the guides were distributed to platoons.

No attempt was made to keep O/Cs blind regarding the experimental condition in effect for each rotation (i.e., baseline vs. experimental). O/Cs on the Warrior Leadership Council should certainly have been aware of the experimental condition in effect. However, most other O/Cs could have been unaware of the experimental conditions, as their data collection role did not change in any way across baseline and experimental rotations.

Results

The organization of this section closely parallels the general layout of the IM Checklist (see Appendix A). Analyses of the results for individual items were based on the calculation of descriptive statistics (i.e., frequency distributions for yes/no and multiple choice items and means for quantitative items like the number of communication systems available). Chi-square tests were performed when the combined results of two yes/no or multiple choice items were of interest (e.g., the relationship between mission planning and mission accomplishment).

Each analysis was based on the maximum sample size available for that analysis; thus, sample sizes varied somewhat across analyses due to missing checklist data. Again, one purpose of the present investigation was to gather information on the prevalence of various unit IM practices during JRTC missions. For that reason, analyses related to the prevalence of IM practices were based on the combined results of all seven rotations ($N \leq 758$). A second purpose of the investigation was to evaluate the effectiveness of the IM Guide. Analyses related to guide effectiveness were based on a comparison of results from the baseline ($n \leq 489$) and experimental groups ($n \leq 269$).

Unit Communication Systems

Over seven rotations, the most common primary communication system observed at the battalion level was the frequency modulation (FM) radio, found on 49.2% of the IM Checklists received (see Section I of the IM Checklist in Appendix A). The most common backup system observed was the Force XXI Battle Command Brigade and Below (FBCB2) system, found on 31.3% of the checklists. Battalions had an average of 5.98 primary systems available, of which 5.52 systems were operational (92.3%). Battalions also had an average of 4.46 backup systems available, of which 4.21 were operational (94.4%).

At company level, the most common primary system observed was the Advanced System Improvement Program (ASIP) radio, found on 35.2% of the checklists received. The most common backup system observed was the FBCB2 system, found on 25.0% of the checklists. Companies had an average of 9.47 primary systems available, of which 9.02 were operational (95.2%). Companies also had an average of 6.46 backup systems available, of which 5.86 were operational (90.7%).

At platoon level, the most common primary system observed was the ASIP radio, found on 50.9% of the checklists received. The most common backup system observed was a radio manufactured by Icom America, Inc. Called the Icom radio by O/Cs, it was found on 30.9% of

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the checklists. Platoons had an average of 5.03 primary systems available, of which 4.92 were operational (97.8%). They also had an average of 4.67 backup systems available, of which 4.32 were operational (92.6%).

System Proficiency

At battalion level, Soldiers were trained to use their primary and backup communication systems in 73.7% of the cases overall. They efficiently operated their systems in 85.7% of the cases and maintained a continuous flow of information 62.1% of the time (see Questions 2-4 in Section I of the IM Checklist in Appendix A). Although battalions in the experimental group had better performance than those in the baseline group on these three measures (80.0% vs. 68.8%, 86.4% vs. 83.3% and 65.2% vs. 50.0%, respectively), none of these differences was found to be statistically significant.

At company level, Soldiers were trained to use their systems in 82.5% of the cases overall. This figure included 95.1% in the experimental group and 73.9% in the baseline group, a difference that was highly significant statistically [$\chi^2(1, N = 200) = 14.88, p = .001$]. In addition, Soldiers efficiently operated their systems in 87.3% of the cases overall, including 96.3% in the experimental group and 71.7% in the control group, another difference that was highly significant statistically [$\chi^2(1, N = 126) = 15.83, p = .001$]. Soldiers at company level maintained a continuous flow of information 69.8% of the time, including 82.5% in the experimental group and 47.8% in the control group. This difference was also highly significant statistically [$\chi^2(1, N = 126) = 16.67, p = .001$].

At platoon level, Soldiers were trained to use their systems in 91.3% of the cases overall. They efficiently operated their systems in 94.9% of the cases and maintained a continuous flow of information 78.3% of the time. Although platoons in the experimental group had poorer performance than those in the baseline group on these three measures (90.8% vs. 91.6%, 94.0% vs. 96.6%, and 72.5% vs. 88.1%, respectively), only the last difference was found to be statistically significant [$\chi^2(1, N = 161) = 5.34, p = .021$].

Information Relevance

Six questions on the IM Checklist pertaining to information relevance were completed by both battalion and company O/Cs (see Section II of the IM Checklist in Appendix A). A summary of the results for battalions is shown in Table 2. Although battalions in the experimental group did better than those in the baseline group on five of the six measures, none of the group differences was found to be statistically significant. A summary of the results for companies is shown in Table 3. Companies in the experimental group did better than those in the baseline group on five of six measures, with two of the differences being highly significant statistically (i.e., specified requirements answered and implied requirements answered).

Table 2
Percentage of Baseline and Experimental Group Battalions
With Six Information Relevance Characteristics

Information Relevance Characteristic	Group Percentage		df	n	χ^2	p
	Baseline	Experimental				
Relevant info received/disseminated	60.5	80.0	1	63	2.64	.104
Specified requirements answered	68.4	82.6	1	61	1.49	.222
Implied requirements answered	37.8	44.0	1	62	.23	.628
Information gaps filled	43.6	64.0	1	64	2.54	.111
Distracters passed	56.4	40.0	1	64	1.64	.200
Distracters had negative impact	66.7	78.9	1	25	.38	.539

Note. Higher percentages on the last two characteristics represent poorer performance. Percentages for the baseline and experimental groups combined were 68.3%, 73.8%, 40.3%, 51.6%, 50.0%, and 76.0% for the six information relevance characteristics, respectively.

Table 3
Percentage of Baseline and Experimental Group Companies
With Six Information Relevance Characteristics

Information Relevance Characteristic	Group Percentage		df	n	χ^2	p
	Baseline	Experimental				
Relevant info received/disseminated	76.5	84.1	1	235	1.91	.167
Specified requirements answered	74.8	89.9	1	230	7.33	.007
Implied requirements answered	56.6	75.0	1	223	7.43	.006
Information gaps filled	71.1	79.7	1	231	2.04	.153
Distracters passed	45.3	45.7	1	231	.01	.960
Distracters had negative impact	78.4	66.7	1	97	1.53	.216

Note. Higher percentages on the last two characteristics represent poorer performance. Percentages for the baseline and experimental groups combined were 79.1%, 80.0%, 63.2%, 74.0%, 45.5%, and 71.1% for the six information relevance characteristics, respectively.

Information Quality

Seven questions on the IM Checklist pertaining to information quality were completed by both battalion and company O/Cs (see Section II of the IM Checklist in Appendix A). A summary of the results for battalions is shown in Table 4. Although battalions in the experimental group did better than those in the baseline group on three of the seven measures, none of the group differences was found to be statistically significant. A summary of the results for companies is shown in Table 5. Companies in the experimental group did better than those in the baseline group on six of seven measures, with two of the differences being statistically significant (i.e., usability and completeness).

Table 4
Percentage of Baseline and Experimental Group Battalions
With Seven Information Quality Characteristics

| Information Quality Characteristic | Group Percentage | | df | n | χ^2 | p |
	Baseline	Experimental				
Quality info received/disseminated	50.0	64.0	1	65	1.22	.269
Accurate	73.0	66.7	1	61	.28	.598
Timely	46.2	24.0	1	64	3.19	.074
Usable	57.1	52.2	1	58	.14	.710
Complete	32.4	48.0	1	62	1.52	.217
Precise	24.3	40.0	1	62	1.72	.189
Reliable	70.3	60.0	1	62	.70	.402

Note. Percentages for the baseline and experimental groups combined were 55.4%, 70.5%, 37.5%, 55.2%, 38.7%, 30.6%, and 66.1% for the seven information quality characteristics, respectively.

Table 5
Percentage of Baseline and Experimental Group Companies
With Seven Information Quality Characteristics

| Information Quality Characteristic | Group Percentage | | df | n | χ^2 | p |
	Baseline	Experimental				
Quality info received/disseminated	63.0	69.5	1	236	1.00	.316
Accurate	73.9	79.3	1	235	.85	.356
Timely	58.6	56.1	1	234	.13	.717
Usable	63.4	76.3	1	222	3.90	.048
Complete	40.3	56.1	1	226	5.26	.022
Precise	42.4	49.4	1	225	1.03	.309
Reliable	68.1	76.5	1	225	1.82	.178

Note. Percentages for the baseline and experimental groups combined were 65.3%, 75.7%, 57.7%, 68.0%, 46.0%, 44.9%, and 71.1% for the seven information quality characteristics, respectively.

Quality Control

Company and platoon O/Cs were asked if observed units had an effective system to determine the relevance and quality of information prior to dissemination (see Question 1 in Sections III and IV of the IM Checklist in Appendix A). Specifically, O/Cs wanted to know if unit personnel knew the Commander's Critical Information Requirements (CCIR), Friendly Forces Information Requirements (FFIR), and/or Priority Intelligence Requirements (PIR). Overall, 59.0% of the companies observed had effective quality control systems in place. This

included 62.4% of the experimental companies and 57.2% of the baseline companies, a difference that was not statistically significant. Overall, 68.3% of the platoons observed had effective quality control systems in place. This included 63.8% of the experimental companies and 75.8% of the baseline companies, a difference that also was not statistically significant.

Standard Format

Company and platoon O/Cs were asked if observed units disseminated information in a standard format (see Question 3 in Section III and Question 2 in Section IV of the IM Checklist in Appendix A). Overall, 43.9% of the companies and 58.7% of the platoons disseminated information in a standard format. Within these two echelons, no significant differences between baseline and experimental units were found.

Information Storage

Company and platoon O/Cs were also asked if units had either an electronic or manual system to store information of high relevance and quality (see Question 5 in Section III and Question 3 in Section IV of the IM Checklist in Appendix A). Overall, 66.7% of the companies and 46.3% of the platoons had some kind of information storage system. Within the two echelons, no significant differences between baseline and experimental units were found.

Command Post Information Dissemination

Company O/Cs were asked if important information was displayed and disseminated to all command post elements (e.g., forward observers, engineers, or liaison officers). Overall, 57.5% of the observed companies disseminated information throughout their command posts. No significant difference between baseline and experimental companies was found on this measure (see Question 2 in Section III of the IM Checklist in Appendix A).

Decision Makers

Company O/Cs were also asked to identify the person who made decisions about what kinds of information should be disseminated and to whom it should be sent. The commander was identified most often (43.3%), followed by the executive officer (5.7%), the radio/telephone operator (5.7%), the operations non-commissioned officer (2.4%), the first sergeant (1.6%), and no one (1.2%). The remaining 41.9% of the company checklists indicated two or more of the above persons were jointly responsible for making decisions about information dissemination. No significant difference between baseline and experimental companies was found on this measure (see Question 4 in Section III of the IM Checklist in Appendix A).

Communication Security

O/Cs at all echelons were asked if units used proper security when disseminating information and when switching between primary and backup communication systems (see Section V of the IM Checklist in Appendix A). Overall, 87.2% of the observed units used proper security when disseminating information and 84.2% used proper security when switching

between primary and backup systems. The baseline and experimental groups did not differ significantly on these measures.

Mission Planning and Rehearsal

O/Cs at all echelons were asked if units included IM in the planning process. They were also asked if units rehearsed their communication plans. Overall, 51.5% of the observed units included IM in their planning and 42.9% rehearsed their communication plans. No significant differences between baseline and experimental groups were found on these measures (see Questions 1 and 2 in Section VI of the IM Checklist in Appendix A).

Both mission planning and rehearsal were associated with significantly higher levels of mission accomplishment. When units emphasized IM during the planning process, effective IM was found to enhance mission accomplishment 83.0% of the time. But when IM was not emphasized during planning, effective IM enhanced mission accomplishment only 33.4% of the time $[\chi^2(1, N = 668) = 169.96, p = .001]$. Similarly, when units rehearsed their communications plan, effective IM was found to enhance mission accomplishment 84.3% of the time. When the communications plan was not rehearsed, effective IM enhanced mission accomplishment only 40.0% of the time $[\chi^2(1, N = 673) = 134.51, p = .001]$.

Mission Accomplishment

Overall, 59.4% of observed units had effective IM practices that enhanced mission accomplishment. This included 64.5% of the experimental group and 56.7% of the baseline group, a difference that was statistically significant $[\chi^2(1, N = 678) = 3.94, p = .047]$. Overall, 55.9% also had ineffective IM practices that degraded mission accomplishment. This included 56.2% of the experimental group and 55.7% of the baseline group, a difference that was not statistically significant.

Because the experimental group performed significantly better than the baseline group in terms of effective IM practices that enhanced mission accomplishment, a separate analysis was formed for each echelon. Although 52.4% of the experimental battalions and 32.4% of the baseline battalions were found to have effective IM practices, the difference was not statistically significant, a result that may have been impacted by a relatively small sample ($n = 58$). At company level, 73.4% of the experimental group and 58.4% of the baseline group had effective IM practices, a difference that was found to be statistically significant $[\chi^2(1, N = 233) = 5.05, p = .025]$. At platoon level, 61.3% of the experimental group and 59.2% of the baseline group were found to have effective IM practices, a difference that was not statistically significant. Thus, although experimental units at each echelon tended to have better IM practices than baseline units, the performance difference only reached statistical significance at the company level.

Primary Communication System and Mission Accomplishment

The relationship between a unit's primary communication system and mission accomplishment is summarized in Table 6. The FBCB2 system and the Single Channel Ground and Airborne Radio System (SINCGARS) were most often associated with mission

enhancement, while the ASIP radio and FBCB2 system were least often associated with mission degradation. Because communication systems were not randomly assigned to units and because the sample sizes for some systems were relatively small, one should be cautious in generalizing the results of this analysis to all military units.

Table 6

Percentage of Units With Enhanced and Degraded Missions by
Primary Communication System

Primary Communication System	n	Enhanced	Degraded
ASIP radio	268	59.9%	46.6%
FBCB2 system	25	76.0%	56.0%
FM radio	184	51.1%	63.6%
Icom radio	14	57.1%	78.6%
SINCGARS	88	65.9%	58.0%
Other	69	55.7%	63.8%
Overall	648	58.3%	55.9%

Note. ASIP = Advanced System Improvement Program; FBCB2 = Force XXI Battle Command Brigade and Below; FM = Frequency Modulation; SINCGARS = Single Channel Ground and Airborne Radio System.

Discussion

One purpose of the present investigation was to determine the overall prevalence of various unit IM practices during force-on-force missions at JRTC, in an attempt to pinpoint those IM areas in which units have the greatest difficulty. Based on the combined results from seven JRTC rotations, several areas of relative weakness were found. While units were able to address specified information requirements fairly well, they had much greater difficulty answering implied requirements (see Tables 2 and 3). In terms of information quality, units were better at providing accurate and reliable information than they were at providing complete and precise information (see Tables 4 and 5). Although most units were able to operate their communication systems efficiently, they found it more difficult to maintain a continuous flow of information with those systems. In disseminating information, a relatively high percentage of units, particularly companies, lacked a standard format. Finally, only about half of the observed units included IM in the planning process, while less than half rehearsed their communication plans.

Areas of relative strength were also found. In particular, the vast majority of units were able to keep a high percentage of their communication systems in operational status. They were also adept at using proper security when disseminating information and when switching between primary and backup systems.

A second purpose of the investigation was to evaluate the effectiveness of the IM Guide as a job performance aid. There was little evidence to suggest the IM Guide improved unit IM performance at battalion or platoon levels, yet it appeared to be beneficial at company level. Companies given the IM Guide were significantly more likely to maintain a continuous flow of information, to efficiently operate their systems, and to have Soldiers that were trained to use their systems. In addition, these companies were significantly more likely to answer both specified and implied information requirements, while disseminating information that was significantly more usable and complete (see Tables 3 and 5). Finally, companies with the guide were significantly more likely to have IM that enhanced their mission accomplishment than companies without the guide.

There were many factors that influenced a unit's mission success at JRTC, not just their IM practices. Thus, it was difficult within the scope and design of the present investigation to precisely determine the relationship between a unit's IM performance and its overall mission performance. However, there are two things that units can do in the IM area that should drastically improve their chances for mission success. First, they should include IM in mission planning. Second, they should rehearse their communication plans. During our investigation, units that did these two things were much more likely to have IM practices that enhanced their mission accomplishment than units that did not. Similar findings were obtained by Evans and Baus (2006), in an investigation of troop leading procedures at JRTC.

Evaluating the relative performance of different communication systems was never a goal of the present investigation. Nevertheless, the FBCB2 system seemed to contribute to better IM at the battalion and company levels over time. Compared with other primary systems, the FBCB2 system was associated with the highest level of mission enhancement and the second lowest level of mission degradation (see Table 6). In contrast, FBCB2 had no apparent benefit when used as a backup communication system. Compared with other backup systems, FBCB2 was associated with the lowest level of mission enhancement (49.6%). There is a relatively simple explanation for this apparent contradiction in the findings. Because FBCB2 is one of the newest and most complex of the Army's communication systems, it was still fairly new to units at the start of our investigation. In the beginning, units tended to use it as a backup system exclusively. Near the end of our investigation, however, units were much more likely to use it as their primary system, as they became more familiar with its features and capabilities.

Based on the overall results of our IM investigation, both the authors and members of the Warrior Leadership Council recommend the continued use of the IM Checklist at JRTC, so O/Cs can systematically gather supporting data on unit IM practices to use in their AARs. The continued use of the IM Guide is also recommended for companies. Because little value was derived from its use by battalions or platoons, it may be useful to call it the Company IM Guide henceforth. Electronic versions of the IM Checklist and Company IM Guide are available through ARI's public website at http://www.hqda.army.mil/ari .

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Appendix A

An Enlarged View of the Information Management Checklist

INFORMATION MANAGEMENT (IM) CHECKLIST (*Revision # 9: 22 June 06*)

Disclosure: Data collected with this form is to be used for routine research purposes only. Information will not be used in whole or in part in making any determination about an individual or unit. Information gathered will be used for statistical control purposes only and will not be disclosed to any unit undergoing Rotations at the Joint Readiness Training Center.

Date: FROM _____ TO _____   Type Unit: IN AR SF CAV RSTA FA EN ADA

AVN SC MI MP MS OD QM TC CA CHEM PSYOPS. Unit Observed: BN SQD CO BTRY TRP PLT

SEC ATT DET   **Rotation Phase:**   LF   D- DAY to MID POINT   MID POINT to ENDEX

(Please write date and circle/write appropriate type unit, unit observed and rotation phase.)

BN/SQD/BTRY/CO/TRP   SECTION I   UNIT COMMUNICATION SYSTEMS   *PLT/SEC/ATT/DET*
(Completed by O/Cs at each echelon)

1. What are the primary and backup communication systems used by the unit to disseminate and receive information from/to higher, subordinate, adjacent units and units (i.e. CA, SF, PYSOPS) operating in the AO?

- Identify Primary system?_____ Number available? _____ Number operational? _____

- Identify Backup system?_____ Number available? _____ Number operational? _____

2. Are Soldiers trained to operate the systems? Yes   No

3. Is the primary system being used and do Soldiers operate the systems efficiently? Yes   No

4. Does the unit communication system allow for a continuous flow of information to/from higher, subordinate, adjacent units and units operating in the AO? Yes   No

Comments: _____

BN/SQD   SECTION II INFORMATION RECEIVED/DISSEMINATED   *BTRY/CO/TRP*
(Completed by Battalion and Battery, Company, Troop O/Cs)

1. Does the unit disseminate and receive *relevant* information to/from higher, subordinate, adjacent units and units operating in the AO? Yes   No (Identify element excluded) _____

- Specified: Answers specified requirements (facts, estimates, assumptions)? Yes   No

- Implied: Answers implied requirements (important information the commander has not requested)? Yes No

- Gaps: Information needed to achieve situational understanding but do not have? Yes   No

- Distracters: Information passed that the commander does not need? Yes   No

- Do distracters have an impact on the unit's capability to manage information?   Yes   No   NA

2. Does the unit disseminate and receive *quality* information to/from higher, subordinate, adjacent units and units operating in the AO? Yes   No (Identify element excluded) _____

- Accuracy: Information conveys actual situation based on facts? Yes   No

- Timeliness: Information has not been overtaken by events? Yes   No

- Usability: Information is easy to understand and display in a standard format that immediately conveys the meaning? Yes   No

- Completeness: Information contains all of the required components? Yes   No

- Precision: Information has the required level of detail (no more and no less)? Yes   No

- Reliability: Information is trustworthy, uncorrupted, sent secure and undistorted? Yes   No

Comments: _____

A-2

BTRY/CO/TRP   SEC III   BATTERY/COMPANY/TROOP INFORMATION MANAGEMENT
(Completed by Battery, Company, Troop O/Cs)

1. Does the unit have an effective system to determine what is relevant and quality information prior to disseminating information (i.e. CCIR, FFIR, PIR)? Yes No

2. Is relevant and quality information displayed and disseminated to all elements in the command post (i.e. FO, ENG, LNOs)? Yes No (Identify element excluded) _____

3. Is information disseminated in a standard format? Yes No

4. Who makes the decision as to what is relevant and quality information, decision to disseminate the information and to what units? (i.e., CDR, XO, 1SG, Ops NCO, RTO)?

5. Does the unit have a system to store relevant and quality information (i.e. DA Form 1594, electronic/manual)? Yes No Comments: _____

PLT/SEC   SEC IV   PLT/SEC/ATT/DET/INFORMATION MANAGEMENT   **ATT/DET**
(Completed by Platoon, Section, Attachment, Detachment O/Cs)

1. Does the unit have an effective system to determine what is relevant and quality information prior to dissemination? Yes No

2. Does the unit receive and send information from/to higher, subordinate and adjacent units using a standard format? Yes No

3. Does the unit have a system to record, display and store relevant and quality information (i.e. DA Form 1594, electronic/manual)? Yes No Comments: _____

BN/SQD/BTRY/CO/TRP   SEC V   COMMUNICATION SECURITY   **PLT/SEC/ATT/DET**
(Completed by O/Cs at each echelon)

1. Did units use proper security when disseminating information (using the need to know rule) and does the system/method meet the required security requirements for passed information? Yes No

2. Did units apply and enforce proper security requirements when switching from the primary to a backup system/method and vice versa? Yes No NA Comments:_____

BN/SQD/BTRY/CO/TRP   SEC VI   MISSION PLANNING/EXECUTION   **PLT/SEC/ATT/DET**
(Completed by O/Cs at each echelon)

1. Did the unit include and emphasize information management during the planning process? Yes No

2. Did the unit rehearse the communications plan? Yes No

3. Did effective Information Management enhance unit mission accomplishment? Yes No

4. Did ineffective Information Management degrade unit mission accomplishment? Yes No

Comments:_____

BN/SQD/BTRY/CO/TRP   SEC VII   OVERALL COMMENTS   **PLT/SEC/ATT/DET**
(Completed by O/Cs at each echelon)

_____

_____

_____

_____

_____

O/C INITIALS_____   O/C CALL SIGN_____   O/C DIVISION_____
ROTATION NUMBER: _____

Appendix B

An Enlarged View of the Information Management Guide

INFORMATION MANAGEMENT GUIDE

PART I STANDING OPERATING PROCEDURE

1. Does your SOP include Information Management?

- Does it identify and explain relevant information?

- Does it identify and explain high-quality information?

- Does it require information to be sent in a standard format?

> RECOMMEND: If Information Management is not included in your SOP you may consider retrieving information from FM 6-0 or the Center for Army Lessons Learned (CALL).

2. Does your SOP require communication PCCs, PCIs, PMCSs and a communication check of all systems during the planning phase, prior to departure from your FOB?

3. Do all of your subordinate and attachment leaders have a copy of your SOP?

4. Are your subordinate leaders trained and do they fully understand your SOP?

5. Have you spot checked your subordinate leaders and your individual Soldiers to see if they are trained and fully understand your SOP for Information Management?

6. Are your operators trained to efficiently and effectively operate all of your communication systems?

PART II PLANNING

1. Do you cover your communications plan during the planning phase for all operations (<u>to include a plan for lost communications</u>)?

2. Do you rehearse your communications plan with your subordinate and attached leaders?

3. Do you spot check to ensure your subordinate and attachment leaders/Soldiers understand your plan?

> REMINDER: Units and Soldiers do what the Commander/Leader checks!

4. Do you have a standard format for sending information and do your subordinate and attached leaders understand it?

> RECOMMEND: Use the keyword SALUTE format (FM 101-5-2)

5. Do your attached leaders understand your requirement for relevant and high quality information?

> REMINDER: Treat attachments the same as your own unit!

6. Are all of your communication systems checked prior to execution?

Identify Primary System: _____ Number Operational:_____

Identify Backup System: _____ Number Operational:_____

7. Can you effectively communicate with higher/subordinate/adjacent and attached units?

PART III EXECUTION

> QUESTION: Who makes information management decisions (e.g., what is relevant and high quality information. when to disseminate. to what units)?

1. Do your communication systems operate effectively throughout your area of operation?

2. Does the leader disseminate and receive relevant information to/from higher/subordinate/ attachments/adjacent units and units operating in your AO (e.g., CA, SF, PSYOPS)?

- Specified: Answers specified requirements (facts, estimates, assumptions)?

- **Implied: Answers implied requirements (important information the commander/leader has not requested)?**
- **Gaps: Information needed to achieve situational understanding but do not have?**
- **Distracters: Information passed that the commander/leader does not need?**
- **Do distracters have an impact on your capability to manage information and mission accomplishment?** | REMINDER: If distracters interrupt your information management capability you should discuss a fix with your higher and subordinate leaders!

3. Does the leader disseminate and receive high quality information to/from higher subordinate/attachments/adjacent units and units operating in your AO (e.g., CA, SF, PSYOPS)?

- **Accuracy: Information conveys actual situation based on facts?**
- **Timeliness: Information has not been overtaken by events?**
- **Usability: Information is easy to understand and displayed in a standard format that immediately conveys the meaning?** | RECOMMEND: Use the keyword SALUTE format (FM 101-5-2)
- **Completeness: Information contains all required components?**
- **Precision: Information has the required level of detail (no more and no less)?**
- **Reliability: Information is trustworthy, uncorrupted, sent secure and undistorted?**

4. Does your unit record, display and store relevant and high quality information?

5. Does your unit use proper security measures when disseminating information (use the need to know rule and have access to the black, white, gray lists)?

6. Does your unit use unsecured radios (off-the-shelf-items)?

PART IV MISSION ACCOMPLISHMENT

1. How did effective information management enhance your mission accomplishment?

2. How did ineffective information management degrade your mission accomplishment?

3 What areas do you need to improve?

PART V AFTER-ACTION-REVIEW

REMINDER: Information Management is critical to situational awareness and must be a primary part of your AAR for each mission.

1. List and discuss areas of information management that must be sustained/improved.

2. Determine who is responsible for fixing areas that need improvement.

3. How did your information management affect other unit's mission accomplishment?

NOTES:

_____

_____

_____